

APPENDIX C
HEALTH AND SAFETY PLAN

**HEALTH AND SAFETY PLAN
ENVIRONMENTAL ACTIVITIES
FORMER SAFETY-KLEEN CORPORATION SERVICE CENTER
SILVER SPRING, MARYLAND**

July 13, 2005

Project No: 198-002

SUBMITTED BY: TRIHYDRO CORPORATION

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I certify that I have read and understand the contents of this "Health and Safety Plan, Environmental Activities, Former Safety-Kleen Corporation Service Center, Silver Spring, Maryland," and reviewed appropriate Job Safety Analyses (JSAs) and safety documents for hazards that may be encountered on this project.

Name

Company

Date



Trihydro

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1.0 INTRODUCTION

This document describes the health and safety procedures for groundwater sampling and environmental activities at the Former Safety-Kleen Corporation Service Center in Silver Spring, Maryland.

All Trihydro Corporation personnel will follow this plan. Subcontractors may wish to use this plan as a guideline. However, subcontractors are encouraged to follow a health and safety plan developed by their respective companies. The primary responsibility for employee safety lies with each company for its own employees. However, each field team member and the separate companies working on this project will maintain a general responsibility to identify and correct any health and safety hazards and to cooperate toward working as safely as possible.

1.1 SUPPORTING HEALTH AND SAFETY DOCUMENTS

Project work will comply with applicable sections of the state of Maryland Safety Code and the federal Occupational Safety and Health Administration (OSHA). The more stringent standards shall apply.

1.2 PHYSICAL QUALIFICATIONS

All persons shall be physically, medically, and emotionally qualified to perform the duties to which they are assigned. Some factors to be considered in making work assignments are activity knowledge, strength, endurance, agility, coordination, and visual and hearing acuity. All employees will be able to read and understand English.

At no time while on duty may employees use or be under the influence of alcohol, narcotics, intoxicants, or similar mind-altering substances. Employees found under the influence or consumption of substances will be immediately removed from the jobsite.

Operators of any equipment or vehicle shall be able to read and understand the signs, signals, and operating instructions in use.

1.3 PERSONNEL RESPONSIBILITIES

Project personnel who will have responsibility for the oversight of this project are:

Project Manager/Site Health and Safety Officer: Sara Brothers, Trihydro Corporation



Trihydro Team Members:

Justin Pruis, Trihydro Corporation
Tim Bishop, Trihydro Corporation
Allison Riffel, Trihydro Corporation

Subcontractor Team Members:

Trihydro Corporation personnel have completed the OSHA 40-hour HAZWOPER training, and OSHA 8-hour supervisors training as specified by 29 CFR 1910.120.

The responsibilities of each group of personnel are listed below. In general, it is the responsibility of the Project Manager to ensure that the field team has access to this plan and reads the safety procedures. It is the individual's responsibility to bring to the attention of the Project Manager or Corporate Health and Safety Director any portion of this plan and related training that he/she does not fully understand.

Site employees and subcontractors shall conduct safety meetings at appropriate intervals to ensure personnel are fully informed of potential hazards. Attendance at safety meetings is to be documented and attendance sheets signed by all personnel in attendance, retained by Trihydro, and made available to Safety-Kleen Corporation on request. Trihydro's safety meeting report form can be found in Appendix C.

Prior to beginning site work, there will be a meeting of the field team personnel at the site to discuss the contents of this plan. The objective of this meeting is to adequately inform field team personnel of hazard evaluation and safe work practices.

1.3.1 TRIHYDRO CORPORATION PROJECT MANAGER

The responsibilities of the Project Manager with respect to safety are to:

- Conduct initial site safety training for all project team personnel as described in this document;
- Make reasonable effort to ensure that all Trihydro field team personnel have read and understand this Health and Safety Plan;
- Make available to the field team personnel the data known to him/her on this project site;



- Make reasonable effort to ensure that all work performed by Trihydro Corporation is conducted in accordance with safe practices outlined in this plan;
- Communicate to workers what is expected of them;
- Note weather conditions;
- Identify and schedule training;
- Calibrate monitoring equipment;
- Identify and remove hazards where possible;
- Monitor activities for the proper use of personal protective equipment specified in this plan, such as respirators, protective coveralls, gloves, safety boots, protective eyewear, ear plugs, and hard hats;
- Make personal protective equipment available;
- Monitor PPE usage, storage, maintenance, and replace when necessary;
- Make reasonable effort to ensure that safety equipment to be used by field team personnel is maintained in a usable condition;
- Use only safe work practices;
- Initiate emergency phone calls when an emergency or accident requires medical attention;
- Correct unsafe conditions and behaviors immediately; and
- Conduct any health and safety meetings deemed necessary.

1.3.2 TRIHYDRO CORPORATION FIELD TEAM MEMBERS

The responsibilities of the Trihydro Corporation field team member with respect to safety are to:

- Become thoroughly familiar with this safety plan;
- Actively participate in this project health and safety plan;
- Follow safety standards and safe work practices set out by Trihydro Corporation, the client, and regulatory agencies;



- Refuse to perform work when unsafe conditions exist;
- Report potential hazards to the Project Manager;
- Immediately report all potential hazards, accidents, incidents, injuries, and illnesses to the Project Manager and Corporate Health and Safety Manager;
- Use personal protective equipment when needed;
- Check equipment and tools, including personal protective and safety equipment, for hazards before use; and
- Know the location, type, and operation of all site and facility emergency equipment.

1.3.3 SUBCONTRACTOR TEAM MEMBERS

The responsibilities of the Subcontractor Team Members with respect to safety are to:

- Perform work safely;
- Read and understand subcontractor health and safety plans;
- Adhere to applicable health and safety plan protocol;
- Provide applicable health and safety monitoring;
- Report any unsafe acts;
- Properly inspect and maintain heavy equipment and other machines in compliance with applicable sections of the federal and Maryland Occupational Health and Safety Code;
- Supply and maintain safety related protective equipment specified in this plan, such as respirators, protective coveralls, gloves, safety boots, protective eyewear, ear plugs, , and hard hats;
- Enforce corrective action in cooperation with the client and Trihydro Project Manager;
- Inform Trihydro Project Manager of the presence of any potential health or safety hazards; and
- Be aware and alert for signs and symptoms of potential exposure to site contaminants and climatic or acoustic stress.



2.0 HAZARD EVALUATION

Environmental Activities expected to be conducted during this project are summarized in Section 1 of this Health and Safety Plan. A hazard analysis has been conducted to identify the hazards associated with this project to minimize the hazards and their effects.

Field team personnel may be exposed to the general types of hazards described below while conducting site activities.

2.1 PHYSICAL HAZARDS

Field team personnel may be exposed to physical hazards while working on this project. The physical hazards include:

- Vehicle hazards;
- Slips, trips, and falls;
- Muscular injury by overexertion or improper movement (e.g. back injury due to improper lifting); and
- Hazards associated with weather conditions.

2.2 FALL HAZARDS

Fall hazards may be experienced on this project. OSHA requires employees to be protected with fall protection at heights six feet or higher.

2.3 ELECTRICAL HAZARDS

Field team personnel may be exposed to electrical hazards that include:

- Exposure to electrical equipment and overhead power lines; and
- Lightning.

2.4 FIRE/EXPLOSION HAZARDS

Field team personnel may be exposed to fire/explosion hazards during site activities. The fire/explosion hazards include:

- Equipment fires.

2.5 CHEMICAL HAZARDS

Field team personnel may have contact with solvents and petroleum products.

2.6 CLIMATIC HAZARDS

During outside activities, field team personnel may be exposed to climatic stress due to temperature extremes, severe weather, lightning, and high winds. High wind will increase the potential for physical and chemical hazards by blowing objects and/or vapors around and creating airborne particulates.

2.7 ERGONOMIC HAZARDS

The interaction of personnel with their working environment at this site may present potential ergonomic hazards, such as incorrect lifting, equipment vibration, or improper body positioning.

2.8 ACOUSTICAL HAZARDS

Field team personnel may be exposed to excessive noise created by site equipment operations.

2.9 TRAFFIC HAZARDS

Workers accessing well boxes in roadways and parking lots are threatened by serious injuries from moving traffic.

2.10 BIOLOGICAL HAZARDS

Sources of biological hazards include bacteria, viruses, insects, plants, birds, animals, and humans. These sources can cause a variety of health effects ranging from skin irritation and allergies to infections (e.g., tuberculosis, AIDS), cancer, and so on. The biological hazards that may be encountered during this project are:

- Hantavirus;
- Histoplasmosis;

- Ticks (Lyme Disease);
- Psittacosis;
- Stinging Insects;
- Rabies;
- West Nile Virus;
- Blood Born Pathogens;
- Snakes; and
- Spiders.

3.0 SAFE WORK PRACTICES

The following section presents procedures on how to safely address the hazards expected to be encountered during environmental activities for this project. Based on the work to be performed, EPA Level D personal protection has been determined to be adequately protective. Not all tasks require Level D protection; however, these determinations will be made by the Project Manager. If necessary, modifications to work practices and the required level of personal protection will be specified to the field team personnel by the Project Manager.

Site operations shall at all times be under the immediate supervision of a Trihydro representative who has authority to modify the work methods as necessary to ensure safety. All employees and subcontractor personnel shall immediately notify their supervisor of any observed unsafe working conditions and/or practices for correction.

3.1 WORK ZONE ACCESS

The work zone is defined as the area within a 30-foot radius of any persons working in the area. Only authorized personnel will be permitted to enter the work zone. Decontamination areas will be set up in the work areas, as appropriate. Authorized personnel will include those who have duties requiring their presence in the work zone and have received appropriate health and safety training. The Trihydro Project Manager has the right to require the exit of any person from the work zone.

3.2 OVERHEAD POWER LINES

Overhead power lines pose a potential hazard for the operation of equipment when there is a possibility of contact.

A 20-ft minimum clearance shall be maintained from all lines. If the appropriate clearance cannot be maintained, the power lines shall be de-energized.

3.3 PERSONAL PROTECTIVE EQUIPMENT

General personal protective equipment requirements are summarized in tables 1 and 2. The equipment is described in more detail below.

Respiratory Protection: In accordance with OSHA 29 CFR 1910.134. All field team personnel will have available, at a minimum, a half-face air-purifying respirator with organic vapor and acid gas cartridges with particulate (HEPA) pre-filter. All respiratory protection devices will be NIOSH approved and individually fit tested. Before each use, respirator will be fit checked by the individual using the respirator.

Protective Clothing: All field team personnel who handle contaminated soils, liquids, or hand tools, will wear polycoated Tyvek coveralls (or equivalent). All coveralls will be inspected for tears and contamination before use and disposed of appropriately, if contaminated or torn.

Hand Protection: In accordance with OSHA 29 CFR 1910.138, which specifically addresses the need for hand protection, it is mandatory that all field personnel match the appropriate glove material with each application or task. This includes assessing the job for chemical exposure and selecting appropriate gloves based on material, thickness, length, and other traits.

- Employees performing activities at this project site will wear appropriate hand protection when hands are exposed to hazards, such as skin absorption of harmful substances, severe cuts, lacerations or abrasions.
- Base selection of appropriate hand protection on an evaluation of the performance characteristics of hand protection relative to the task to be performed, conditions present, duration of use, and the hazards and potential hazards identified.

All Trihydro field team personnel who handle contaminated soils, liquids, or hand tools, will wear PVC, butyl rubber, or nitrile gloves. Wearing disposable PVC gloves under the outer gloves will provide added protection when handling heavily contaminated material. The gloves go over the Tyvek suit and are taped to the suit.



Even the best chemical resistant glove will break down after repeated chemical exposure. Before each use, employees will inspect all gloves for signs of chemical degradation such as swelling, cracking, shrinking, or discoloration of the material. When any of these signs are detected, it means that the glove has undergone a physical change due to chemical contact and will no longer provide chemical protection. Any glove that shows signs of degradation or damage will be taken out of service immediately and replaced with a new pair.

Foot Protection: In accordance with OSHA 29 CFR 1910.136(a), all field team personnel shall wear protective footwear when working within the site or areas where there is danger of foot injuries due to falling or rolling objects, objects piercing the sole, or electrical hazards. All foot protection will meet guidelines set forth by ANSI Z41-1991. Foot protection will be inspected for cuts, holes, tears, cracks, worn soles, and other damage that could compromise the footwearer's protection. Outsoles should be kept free of stones, tacks, nails, and other debris. Foot protection should be cleaned according to the manufacturer's instructions. Field team personnel will wear neoprene (or equivalent) rubber boots (either with steel toes and shanks or over substantial shoes) when liquids are expected to be encountered. The boots go over the Tyvek suit and are taped to the legs of the suit.

Eye Protection: Field team personnel will wear impact resistant safety glasses with attached side shield in compliance with OSHA 29 CFR 1910.133. Eye protectors shall meet the following minimum requirements:

- Provide adequate protection against the particular hazards for which they are designed;
- Reasonably comfortable when worn under the designated conditions;
- Snug fit and shall not unduly interfere with the movement of the wearer;
- Durable;
- Capable of being disinfected;
- Easily cleaned; and
- Kept clean and in good repair.

Employees whose vision requires the use of corrective lenses in spectacles, and who are required by OSHA Standard 1910.133 to wear eye protection, shall wear goggles or spectacles of one on the following types:

- Spectacles whose protective lenses provide optical correction;

- Goggles that can be worn over corrective spectacles without disrupting the adjustment of the spectacles; or
- Goggles that incorporate corrective lenses mounted behind the protective lenses.

Design, construction, testing, and use of devices for eye and face protection shall be in accordance with ANSI Z87.1-1989.

Ear Protection: Field team personnel will be required to wear hearing protection devices in accordance with OSHA 29 CFR 1910.95 standard (ear plugs or muffs). As a general rule, if field team members must raise their voices to be understood at a distance of 3 feet, they will wear the required ear protection.

Safety Helmet: All field team personnel shall wear a protective helmet, in compliance with OSHA 29 CFR 1910.135(a)(1), when working in any area on the project. All Safety Helmets will meet performance guidelines set forth by ANSI Z89.1-1986, *American National Standard for Personal Protection-Protective Headwear for Industrial Workers Requirements*. All employees will follow the ANSI standard addressing service life of the safety helmet. All employees will inspect their safety helmet daily for signs of dents, cracks, penetration, and any damage due to impact, rough treatment, or wear. Any safety helmet that does not pass the visual inspection should be taken out of service and replaced. Safety helmets are not required inside operating office buildings and vehicles.

3.4 HOUSEKEEPING

The first requirement for safe field operation is that the field team understands and fulfills the responsibility for maintenance and “housekeeping” during environmental activities.

- Suitable storage locations should be provided for all tools, materials, and supplies so that tools, materials, and supplies can be conveniently and safely handled without hitting or falling on a member of the crew or a visitor.
- Work areas, platforms, walkways, scaffolding, and other access ways should be kept free of material, debris, obstructions, and substances such as ice, grease, or oil that could cause a surface to become slick or otherwise hazardous.
- Gasoline should not be stored in any portable container other than a non-sparking, red container with flame arrester in the fill spout, and having the word “gasoline” easily visible on the container.

3.5 VEHICLE SAFETY

Vehicle safety is required to protect the field team personnel from work-related injuries and accidents. Compliance with all site, local, state, and federal traffic laws is required. Workers should drive defensively at all times by continually watching for hazardous conditions, understanding how to defend against them, and taking action in time to avoid problems. Keep eyes and attention on the road and others, and adjust speed and driving to changing weather and traffic conditions.

- All employees who, as a part of their duties, need to operate vehicles on public roads must hold a valid, properly classed driver's license and possess an acceptable driving record.
- Site workers are required to wear seat belts at all times when operating or riding in any vehicle.
- The consumption of alcohol or drugs, even over-the-counter medications and prescriptions, can slow reactions, blur vision, reduce ability to determine distance, and impair judgment. It is a violation of our safety policy for any employee to operate a vehicle with illegal drugs in his/her system or while impaired by alcohol, prescription drugs, or over-the-counter medications.
- All vehicles and other mobile equipment will operate within posted speed limits and only in areas necessary to perform work, and shall observe roadblocks and caution signs.
- Vehicles may be left running only for the purposes of operating auxiliary equipment or lights, and then only when the driver can ensure the vehicle is secure with the transmission in park or neutral and the parking brake set.
- Vehicle operators shall not drive over unprotected hoses or exposed piping.
- Upon notification of a release of flammable vapors, fire, or other immediate dangers, the operator shall immediately shut down all sources of ignition under his/her control. No attempt to start or move vehicles in the area shall be made until all conditions are safe for re-entry.
- All Trihydro employees shall be 3-D Driving (defensive driving) certified before driving on the site.

3.6 HAZARD PROTECTION

The following potential hazards were described in the previous chapter of this plan:

- Physical Hazards;
- Fall Hazards;



- Electrical Hazards;
- Fire/Explosion Hazards;
- Chemical Hazards;
- Climatic Hazards;
- Ergonomic Hazards;
- Acoustical Hazards;
- Biological Hazards.

Procedures to safely address each of these hazards are described below.

3.6.1 PHYSICAL HAZARDS

Personal Protective Equipment (PPE) is designed to protect the field team personnel from most physical hazards expected at the work site. However, the field team personnel should be aware of the potential physical hazards and remain alert during field work. The following procedures will be implemented to minimize the potential for injury from physical hazards:

- Keep all support vehicles, unnecessary equipment, and unnecessary personnel outside of the work zone;
- Provide proper housekeeping of the site; and
- Store and secure all necessary equipment outside the work zone until use is required.

3.6.2 FALL HAZARDS

Slips, trips, and falls are second only to automobile accidents in causing personal injury. On stairways alone, falls result in almost two million disabling injuries yearly. There are thousands more minor injuries caused by slips, trips, and falls each year. Most alarming of all is the fact that industrial falls cause over 1000 deaths each year. Here are some factors that contribute to slips, trips, and falls:

- Loose, irregular surfaces such as gravel, shifting floor tiles, and uneven sidewalks, can make it difficult to maintain your footing;
- Oil, grease, and other liquids can make walking surfaces extremely slick;

- Stairs present a special challenge, especially those that are taller, shorter, have a smaller tread depth, or are otherwise irregular;
- Obstructed aisles or walkways present tripping hazards or require frequent changes of direction, throwing you off balance;
- Insufficient light can make it difficult to see obstacles and notice changes in the walking surface;
- Shoes with slick soles provide insufficient traction;
- Moving too fast increases the likelihood you will misjudge a step or encounter a hazard before you have a chance to notice it;
- Carrying items can both obstruct your vision and impair your balance; and
- Inattention and distraction interfere with your awareness of all of these hazards and increase your risk of injury.

3.6.3 ELECTRICAL HAZARDS

The potential exists for field team personnel to encounter electrical hazards, particularly during site activities. The following procedures will be implemented to minimize the potential for injury from electrical hazards:

1. Be alert for sudden weather changes and the potential for lightning.

When you see lightning, count the time until you hear thunder. If that is **30 seconds** or less, the thunderstorm is close enough to be dangerous – seek shelter (if you can’t see the lightning, just hearing the lightning is a good back-up rule). Wait **30 minutes** or more after the lightning flash before leaving shelter.

3.6.4 FIRE/EXPLOSION HAZARDS

The potential exists for field team personnel to encounter fire/explosion hazards during site activities. The following additional precautions will be implemented to minimize the potential for fire or explosion:

- If fire, smoke, or heat emanate from a well, the field team personnel will inject nitrogen gas into the borehole or well; work will not recommence until the possibility for fire or explosion has abated.

3.6.5 CHEMICAL HAZARDS

Governmental regulations require that Trihydro has one easy reference for important information regarding hazardous substances in the workplace. This information is contained on labels and in Material Safety Data Sheets (MSDS) for each substance in the workplace.

If a hazardous material is encountered that the employee is not familiar with, the employee must review the MSDS for the material. Read labels and the MSDS carefully, follow warnings and instructions, use the correct protective clothing and equipment when directed, learn emergency procedures, and practice safe work habits. Employees should direct questions about a hazardous material to their supervisor.

The following chemical hazards may be encountered at the work site:

- Hydrocarbon liquids and gases, which may adversely affect human health through injection, skin contact, and inhalation; and
- Acidic and caustic solids or liquids, which may adversely affect human health through skin contact and inhalation.

The following procedures will be implemented to minimize potential harm from hazardous organic chemicals:

- The Trihydro Project Manager will refer to the NIOSH/OSHA Pocket Guide to Chemical Hazards for the proper response to hazardous organic chemicals if field team personnel complain of irritation, giddiness, headache, or nausea; and
- The project site Material Safety Data Sheet (MSDS) notebook will be kept in a centralized location on site.

The following procedures will be implemented to minimize potential harm from acidic or caustic substances:

- The Trihydro Project Manager will instruct field team members to stop work and leave the work zone if there are indications of the presence of acidic or alkaline substances (eye, nose, throat, or skin irritation; holes in clothes);
- The Trihydro Project Manager will instruct the field team members complaining of these symptoms to immediately flush the area of the body exhibiting the symptoms with cool or cold water;
- The Trihydro Project Manager will determine the pH of the apparent offending substance; and



- If the pH is less than 1 or greater than 12 standard units, the field team personnel will be required to wear Tyvek coveralls (in addition to required flame retardant coveralls), chemically resistant gloves, chemically resistant boots, splash goggles, and half mask respirators with acid and particulate cartridges.
- The Trihydro Project Manager will instruct the field team personnel to minimize contact with the acidic or caustic substance.

3.6.6 CLIMATIC HAZARDS

During day-to-day field work, all onsite personnel will be alert for the signs and symptoms of climatic stress. Field team members will be observed for the following signs and symptoms of climatic stress:

- Change in body temperature;
- Profuse sweating (or absence of sweating when sweating is expected);
- Skin color change;
- Shivering;
- Disorientation or slurring of speech;
- Vision problems; and
- Muscle cramps or spasms.

3.6.6.1 HEAT STRESS

Heat stress is the increased heart rate, body temperature, respiration, and perspiration that results when the body works to reduce unwanted heat. The cause of the increase in body temperature can be either external or internal. External heat sources include high ambient air temperature, direct sunlight, high humidity, high altitude, and heat generating processes at industrial sites. Internal heat sources include the effects of alcohol consumption, certain medications, cardiac and respiratory conditions, inadequate acclimatization, fatigue, poor physical condition, heavy work, and prolonged use of personal protective equipment.

Heat stroke is the most serious level of heat stress and can be lethal. Heat stroke occurs when an abnormally high body temperature disturbs the body's natural heat regulating system. During heat stroke, moisture from sweat is not available to stimulate evaporative cooling. Some symptoms of heat stroke include:

- Extremely high body temperature;
- Red, hot, dry skin (sweating is absent);
- Strong, rapid pulse;
- Convulsions or collapse; and
- Delirium, disorientation, or unconsciousness.

The most important emergency measures to take in the event of heat stroke are:

1. Call for emergency help;
2. Cool the victim rapidly, massaging the entire body in a chilled water bath if possible. At the very least, get the victim to a shaded area until emergency help is available;
3. Monitor body temperature and continue the cooling process only while the body temperature is above 100°F. If the body temperature drops below 100°F, wrap the victim in a blanket to prevent shock;
4. If the victim is conscious, administer liquids, but never give alcoholic beverages or stimulants such as coffee or tea; and
5. If emergency help is not available, seek medical attention during or immediately following the cooling process.

Heat exhaustion is not as severe as heat stroke but can lead to heat stroke if not treated properly. Heat exhaustion is the result of cardiac insufficiency caused by the failure of the circulatory system to compensate for the increased blood flow needed to cool the body, and by dehydration due to profuse sweating. Some symptoms of heat exhaustion include:

- Body temperature is normal or slightly deviant from normal;
- Profuse sweating; pale, clammy skin;
- Weak pulse;
- Fatigue, dizziness or giddiness, fainting;

- Muscle cramps; and
- Nausea or vomiting.

The most important emergency measures to take in the event of heat exhaustion to prevent heat stroke are:

1. Cool the victim in shade or indoors;
2. Have the victim lie down with feet slightly elevated;
3. Loosen clothing;
4. If conscious, administer an electrolyte solution, such as Gatorade, every 15 minutes unless vomiting occurs;
and
5. If symptoms persist or recur, seek medical attention.

Heat cramps are caused by the loss of electrolytes due to prolonged sweating. Muscle pain and spasms can result in potentially hazardous situations, especially when working near heavy equipment. Some symptoms of heat cramps include:

- Painful muscle cramps and spasms or convulsions;
- Heavy sweating, vomiting; and
- Normal or slightly deviant pulse.

The most important emergency measures to take in the event of heat cramps to prevent heat exhaustion and possible heat stroke are:

1. Rest in shade;
2. Gentle massage of the affected area;
3. Administration of an electrolyte solution, such as Gatorade, every 15 minutes unless vomiting occurs; and
4. If symptoms persist or recur, seek medical attention.

Sunburn is usually minor, consisting of a first degree burn of the outermost skin layer. Although the least detrimental heat disorder, a serious sunburn may result in painful, blistered skin (second degree burns), which can hinder or inhibit the ability to work. Some symptoms of sunburn include:

- Painful, red, swollen, or blistered skin;
- Nausea or vomiting; and
- Chills.

The most important emergency measures to take in the event of serious sunburn are:

1. Submerge the affected area in cold water or at least apply cold, wet cloths;
2. Elevate burned extremities;
3. Never break the blisters; and
4. If symptoms persist or recur, seek medical attention.

Prevention of Heat Stress: The work schedule should be paced based on weather conditions. There should be adequate rest periods when electrolyte solutions are available, as it may be necessary to replace body fluids and electrolytes as often as every 15 minutes. Air thermometers and oral medical thermometers should be available. If workers expect heavy sweating as a result of weather or working conditions, salty foods should be eaten (salt tablets are not recommended). Workers on low sodium diets or workers taking diuretics should consult a physician about salt replacement. The Task Leader should be informed about such conditions.

Clothing should be light and reflective and a sunscreen of a least SPF 15 should cover all areas of the body that are exposed to direct sunlight. In the case of perspiration, the sunscreen should be reapplied as necessary. It should be remembered that a thin layer of clouds is not a form of protection against sunburn, as UV rays penetrate thin cloud layers.

3.6.6.2 COLD STRESS

In the event that cold temperatures are encountered, employees will follow this section of the plan.

Cold stress, or even moderately cold temperatures, can be dangerous as a false sense of security may be created under such conditions.

Cold stress is when the body's core temperature drops below 96.8°F (36°C). Symptoms include pain in the extremities, mental confusion, tripping, and falling. This can occur in temperatures of 30°F to 40°F, especially in people doing physical labor. Wind chill factor also needs to be taken into consideration (Table 3).

The primary preventative measure for cold stress is to wear appropriate clothing. The work rate should not be so high as to cause heavy sweating that will result in wet clothing.

Individuals suffering from cold stress should move to a heated area. The outer layer of clothing should be removed and the remainder of clothing loosened. Wet clothing should be replaced with dry. The individual should be instructed to rest until the symptoms are no longer recognizable. If the symptoms appear critical, persist, or get worse, immediate medical attention should be sought.

3.6.7 ERGONOMIC HAZARDS

The interaction of personnel with their working environment at this site may present potential hazards, such as incorrect lifting of heavy loads, equipment vibrations, or improper body positioning. All of the aforementioned conditions are potential factors during site activities. Personnel should always position themselves properly, lift with the legs when lifting equipment or heavy objects, and rely on the buddy system for assistance in lifting loads that are awkward or too heavy for one person. Back strain, the most common ergonomic hazard in the field, may be avoided if site workers ask for assistance when needed. A maximum one-person lift is limited to 50 pounds.

3.6.8 LIFTING PROCEDURES

Back injuries can happen as quickly as one wrong move. Lifting and carrying objects can be safer if:

- When lifting items from below arm level, bend your knees, not your back, to lower your body to the object;
- Bring the load as close as possible to the body before lifting;
- Grip firmly with your hands (not just fingers) and keep your arms and elbows tucked in for more strength;

- Lift by letting your legs push you up, not your back;
- Be sure you can see where you are going and move slowly enough to avoid bumping into other objects;
- Do not twist your body while carrying heavy objects; twisting is a major cause of injury. If you need to change directions, move your feet in that direction first; and
- Lifting is safest when you keep your back straight and your stomach muscles tight. Staying in good physical condition and getting proper exercise are also important.

Loads should be broken down to movable weights, routes planned, and legs used to do the work. If an object is too heavy, help should be obtained or a handcart or other device used.

3.6.9 ACOUSTICAL HAZARDS

When working around mechanical equipment, the potential exists for exposure to excessive noise. All team members should wear hearing protection while working around drilling rigs or equipment on the site.

Field team personnel are not allowed to use Walkmans or similar radios or tape decks.

3.6.10 TRAFFIC HAZARDS

Nearly 100 workers are killed and more than 20,000 are injured in work zones each year, according to the National Institute for Occupational Safety and Health. About half of worker deaths are the result of traffic-related injuries, with the other half caused by being struck by construction vehicles and equipment inside the work zone.

Drivers do not expect to share the road with workers and their equipment. To avoid injuries, it is necessary to get the driver's attention, slow the driver down, guide the driver safely around the work zone, and return the driver to the normal traffic flow safely. All traffic diversion and warning equipment should be sent out with the employees and fully set up before any work begins.

To avoid serious injuries, employees should take precautions:

1. Warning signs should be placed so that drivers will have time to read the messages and react before they reach the work area. At lower speeds (15-30 mph), signs may be placed 30 feet or less from the work area. At 30-40 mph, the first sign drivers see should be about 500 feet before the worksite.

2. All excavations and work areas in roadways should be barricaded and guarded. Traffic control devices should be installed before the work begins.
3. Traffic cones can be used to guide and direct traffic around or through the work areas during daylight hours. They are well suited to short-term or mobile jobs, because they can be stacked. The devices should be installed before the work begins. At least one advance warning sign must be used to explain the cones. Flags inserted in the top of the cones increase their visibility.
4. During sampling activities, one person should function as a flagger to divert traffic while one person collects the samples.
5. Backup trucks and work vehicles can provide an effective barrier to protect workers from moving vehicles in the work zone. Trucks should be positioned between the working area and the flow of traffic. Be sure to allow enough space between the vehicle and the closest workers to prevent it from being pushed into them if it is hit.
6. Backup and stationery vehicles and trucks can also serve as warning devices when equipped with flashing high intensity emergency lights (a revolving light or strobe light above the cab).
7. Flaggers and work crew should wear bright orange reflection vests.
8. Trucks should have backup warning devices.

3.6.11 BIOLOGICAL HAZARDS

3.6.11.1 HANTAVIRUS

Hantavirus pulmonary syndrome (HPS) is a rare but serious, and often deadly, lung infection. Hantavirus pulmonary syndrome is caused by the Sin Nombre virus. This virus is a type of hantavirus. Most hantaviruses attack the kidneys, but the Sin Nombre virus attacks the lungs. It infects the walls of the capillaries (tiny blood vessels in the lungs), making them leak and flooding the lungs with fluid.

Hantaviruses are found in rodents in different parts of the world. Each hantavirus has a preferred rodent host. The Sin Nombre virus is carried by the deer mouse, the cotton rat, and perhaps other rodents common throughout North America. These rodents live in semi-rural and rural areas and infest camps, old buildings, barns, and homes.

Wild rodents spread HPS to people. The Sin Nombre virus is passed in the saliva, urine, and droppings of infected rodents. The virus can live for a few days in contaminated dirt and dust. People are infected when they breathe in tiny particles of these materials in dust from places where rodents are living and active. People can also be infected by handling contaminated materials and then touching the mouth or nose.

The first symptoms are general and flu-like: fever (101°F-104°F), headache, stomach pain, pain in the joints and lower back, coughing, and sometimes nausea and vomiting. The main symptom is difficulty breathing as the lungs fill with fluid. This can quickly lead to an inability to breathe and, in severe cases, death from suffocation. Symptoms can appear from three days to six weeks after infection, but usually within two weeks.

Because the early symptoms are not specific and vary from person to person, HPS is hard to identify in its early stages. It is usually detected only when it affects the lungs and causes breathing problems.

Unlike many illnesses that mainly strike people with weakened immune systems, HPS has hit mostly strong, healthy persons. Those who work, play, or live in closed spaces with active rodent infestation are at risk, although the chances of infection are low.

Infected persons can develop untreatable respiratory failure. HPS is fatal to more than half of those who become infected.

No virus-killing drug is effective against HPS. Although there has been some experimental use of the anti-virus drug, ribavirin, mechanical ventilation (use of a respirator) is the main treatment. Most patients need to be hospitalized in intensive care. The sooner an infected person gets medical treatment, the better the chance of recovery.

The best way to prevent HPS is to:

- Avoid contact with rodents and to avoid inhaling dust that might be contaminated with rodent saliva, urine, or droppings.
- Control mice inside. Keep the work area clean and store food and trash in containers with tight lids. Carefully dispose of dead rodents trapped indoors or brought inside by pets. Rodent-proof the work site by sealing cracks and clearing brush from around foundations.

- Control mice outside. Eliminate possible nesting sites. Elevate hay, woodpiles, and garbage cans, and place them away from the house. Store animal food in closed containers.
- Use safety precautions when cleaning indoor or outdoor areas that might be contaminated with rodent saliva, urine, or droppings. Do not stir up and breathe dust. Before cleaning, wet down potentially contaminated areas with a disinfectant (such as bleach or alcohol). While cleaning, wear rubber gloves and disinfect them after use. Dust masks that cover the nose and mouth can also help.
- When participating in outside activities, stay clear of rodents and their burrows and nests. Keep campsites clean and food tightly sealed. Open up and air out outbuildings and rural or wilderness cabins before entering or cleaning. Remove garbage and trash before leaving.

3.6.11.2 HISTOPLASMOSIS

Although this disease is usually associated with bird and bat droppings, it actually is caused by a fungus. You can only get it by inhaling dust from decayed droppings or contaminated soil. Anyplace where bird or bat droppings have collected is a likely source of the "histo" fungus. Trades most at risk are: bridge painters, demolition workers, heavy equipment operators, heating and air-conditioning system installers or service people, roofers, and trades people working on the restoration of historic or abandoned buildings.

Many people are exposed to histo repeatedly, get infected, but never know it because they have no symptoms. You risk a more serious infection, however, if you are exposed to larger amounts of the fungus, or if your immune system is compromised for some reason. Histo can cause a lung infection that comes on quickly and causes fever, chills, muscle aches, cough, and shortness of breath. Most of the time these symptoms clear up on their own and are often mistaken for the flu. Some infections, though, may become chronic with similar, but less severe, symptoms that may not go away for several months. The most severe, and rarest, form of histo occurs when the fungus spreads to organs throughout the body. Such infections can cause permanent damage to the lungs and even death.

If you experience flu-like symptoms as described above for more than a few days, it is important to seek medical attention, as effective treatment is available. Tell your health care provider you may have been exposed to fungus at your work. Otherwise he or she may not think of this possibility.

Prevention is best. Controlling the risks workers in the trades face is not complicated but care should be taken. Large scale infections have occurred where a large amount of histo-contaminated soil or decayed droppings was disturbed. The main thing to avoid is creating dust that will put the fungus in the air where it can be inhaled.

Try not to disturb soil rich in bird droppings. Often, however, our work requires that we remove such soils. Wet sweeping or vacuuming with a HEPA-filtered machine are the recommended ways to collect such soil. Soil should be placed in heavy-duty plastic bags or other secure containers for disposal.

3.6.11.3 TICKS

There are six tick-borne pathogens that present a significant field hazard, and in some areas account for many serious field incidents. These procedures should be applied during any field activity – even in field areas that are predominantly paved, but with bordering vegetation.

3.6.11.3.1. HAZARD CONTROL

The methods for controlling exposure to ticks include, in order of most preferred to least:

- Avoiding tick habitats and ceasing operations in heavily infested areas;
- Reducing tick abundance through habitat disruption or application of acaricide;
- Personal protection through use of repellants and protective clothing; and
- Frequent tick inspections and proper hygiene.

Vaccinations are not available and preventative antibiotic treatment after a bite is generally not recommended.

3.6.11.3.2. AVOIDANCE AND REDUCTION OF TICKS

To the extent practical, tick habitats should be avoided. In areas with significant tick infestation, consider stopping work and withdrawing from the area until adequate tick population control can be achieved. Remember, tick-borne pathogens present risk of serious illness!

In areas where significant population density or infestation exists, tick reduction should be considered. Tick reduction can be achieved by disrupting tick habitats and/or direct population reduction through the use of tick-toxic pesticides (Damminix, Dursban, Sevin, etc.).

Habitat disruption may include simple vegetative maintenance, such as removing leaf litter and trimming grass and brush. Tick populations can be reduced between 72 and 100% when leaf litter alone is removed. In more heavily infested areas, habitat disruption may include grubbing, tree trimming or removal, and pesticide application (Damminix, Dursban, Sevin, etc.). This approach is practical in smaller, localized areas or perimeter areas that require occasional access. Habitat controls are to be implemented with appropriate health and safety controls, in compliance with applicable environmental requirements, and may be best left to the property owner or tenant, or licensed pesticide vendor. Caution should be exercised when using chemical repellents or pesticides in or around areas where environmental or industrial media samples will be collected for analysis.

3.6.11.3.3. PERSONAL PROTECTION

After other prevention and controls are implemented, personal protection is still necessary in controlling exposure to ticks. Personal protection must include all of the following steps:

- Wear light-colored clothing so ticks can be easily seen. Full-body new Tyvek (paper-like disposable coveralls) may also be used;
- To prevent ticks from getting underneath clothing, tuck pant legs into socks or tape to boots;
- Wear long-sleeved shirts, a hat, and high boots;
- Apply DEET repellent to exposed skin or clothing per product label;
- Apply permethrin repellent to the outside of boots and clothing before wearing, per product label;
- Frequently check for ticks and remove from clothing;
- At the end of the day search your entire body for ticks (particularly groin, armpits, neck and head) and shower; and
- To prevent pathogen transmission through mucous membranes or broken/cut skin, wash or disinfect hands and/or wear surgical-style nitrile gloves anytime ticks are handled.

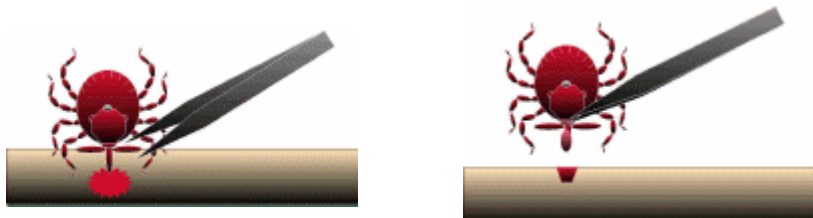
Pregnant individuals and individuals using prescription medications should consult with their physician and/or pharmacists before using chemical repellents. Because human health effects may not be fully known, use of chemical repellents should be kept to a minimum frequency and quantity. Always follow manufacturers' use instructions and

precautions. Wash hands after handling, applying, or removing protective gear and clothing. Avoid hand-to-face contact, eating, drinking, smoking, etc. when applying or using repellents. Remove and wash clothes per repellent product label. Chemical repellents should not be used on infants and children.

Vaccinations are generally not available for tick-borne pathogens. Although production of the LYMERix™ lyme disease vaccination has been ceased, vaccination may still be considered under specific circumstances and with concurrence from the consulting physician. Preventative antibiotic treatment in non-ill individuals who have had a recent tick bite is recommended in specific cases only.

3.6.11.3.4.

TICK REMOVAL



1. Use fine-tipped tweezers or shield your fingers with a tissue, paper towel, or nitrile gloves;
2. Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause the mouthparts to break off and remain in the skin. (If this happens, remove mouthparts with tweezers. Consult your healthcare provider if infection occurs.);
3. Do not squeeze, crush, or puncture the body of the tick because its fluids (saliva, hemolymph, gut contents) may contain infectious organisms. Releasing these organisms to the outside of the tick's body or into the bite area may increase the chance of infectious organism transmission;
4. Do not handle the tick with bare hands because infectious agents may enter through mucous membranes or breaks in the skin. This precaution is particularly directed to individuals who remove ticks from domestic animals with unprotected fingers. Children, elderly persons, and immuno compromised persons may be at greater risk of infection and should avoid this procedure;
5. After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water; and

6. You may wish to save the tick for identification in case you become ill. Your doctor can use the information to assist in making an accurate diagnosis. Place the tick in a plastic bag and put it in your freezer. Write the date of the bite on a piece of paper with a pencil and place it in the bag.

Note: Folklore remedies, such as petroleum jelly or hot matches do little to encourage a tick to detach from skin. In fact, they may make matters worse by irritating the tick and stimulating it to release additional saliva, increasing the chances of transmitting the pathogen. These methods of tick removal should be avoided. In addition, a number of tick removal devices have been marketed, but none are better than a plain set of fine tipped tweezers.

3.6.11.3.5. FIRST-AID AND MEDICAL TREATMENT

Tick bites should always be treated with first-aid. Clean and wash hands and disinfect the bite site after removing embedded tick. Consult a healthcare professional if infection or symptoms and effects of tick-borne illnesses develop.

Medical treatment for tick-borne infections include antibiotics and other medical interventions. Diagnosis of specific illness involves both clinical and laboratory confirmations. Preventative antibiotic treatment in non-ill individuals who have had a recent tick bite is recommended in specific cases only.

Previously infected individuals are not conferred immunity. Re-infection from future tick bites can occur even after a person has contracted a tick-borne disease.

3.6.11.3.6. HAZARD RECOGNITION

An important step in controlling tick related hazards is understanding how to identify ticks, their habitats, their geographical locations, and signs and symptoms of tick-borne illnesses.

3.6.11.3.7. TICK IDENTIFICATION

There are five varieties of hard-bodied ticks that have been associated with tick-borne pathogens. These tick varieties include:

- Deer (Black Legged) Tick (eastern and pacific varieties);
- Lone Star Tick;

- Dog Tick; and
- Rocky Mountain Wood Tick.

3.6.11.3.8. TICK HABITAT

In eastern states, ticks are associated with deciduous forest and habitat containing leaf litter. Leaf litter provides a moist cover from wind, snow, and other elements. In the north-central states, ticks are generally found in heavily wooded areas often surrounded by broad tracts of land cleared for agriculture. On the Pacific Coast, the bacteria are transmitted to humans by the western black-legged (deer) tick and habitats are diverse. Here, ticks have been found in habitats with forest, north coastal scrub, high brush, and open grasslands. Coastal tick populations thrive in areas of high rainfall, but ticks are also found at inland locations.

3.6.11.3.9. ILLNESSES AND SIGNS AND SYMPTOMS

There are six tick-borne pathogens that cause human illness in the United States. These pathogens may be transmitted during a tick bite, normally hours after attachment. The illnesses, presented in approximate order of most common to least, include:

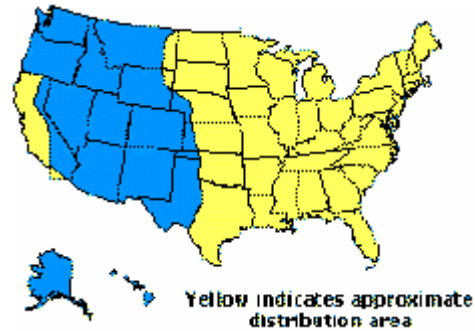
- Lyme (bacteria);
- RMSF (bacteria);
- Ehrlichiosis (bacteria);
- STARI (Southern Tick-Associated Rash Illness) (bacteria);
- Tularemia (Rabbit Fever) (bacteria); and
- Babesia (protozoan parasite).

Symptoms will vary based on the illness, and may develop in infected individuals typically between 3 and 30 days after transmission. Some infected individuals will not become ill or may develop only mild symptoms.

These illnesses may include some or all of the following signs and symptoms: fever; headache; muscle aches; stiff neck; joint aches; nausea; vomiting; abdominal pain; diarrhea; malaise, weakness; and/or small solid, ring-like, or spotted rashes. The bite site may be red, swollen, or develop ulceration or lesions. A variety of long-term symptoms may result when untreated, including debilitating effects and death.



Dog Tick



3.6.11.4 PSITTACOSIS

Psittacosis is an infectious disease in humans that has mild, non-specific flu-like symptoms. Psittacosis refers to any infection or disease caused by *Chlamydia psittaci*, one of several microorganisms in the genus *Chlamydia*. This disease can be transmitted from infected birds to humans.

Chlamydia psittaci infects wild and domestic birds and poultry. Birds which contract the infection include parrots, canaries, pigeons, chickens, ducks, and turkeys. The time between exposure to *Chlamydia psittaci* and the onset of illness in caged birds ranges from three days to several weeks. Sick birds show signs of:

- Sleepiness;
- Shivering;
- Weight loss;
- Breathing difficulties; and
- Diarrhea.

Birds can have a latent infection. That means they appear healthy and do not show any symptoms now but they can show symptoms later. These infected birds carrying the *Chlamydia psittaci* bacteria may shed the organism intermittently or sometimes continuously for weeks or months. Stress associated with nutritional deficiencies, overcrowding, breeding, egg-laying, and prolonged transport may cause birds with a latent infection to shed infectious agents. When shedding occurs, the infected birds excrete the bacteria in the feces and nasal discharges and can remain infective for several months.

Humans can become infected with *Chlamydia psittaci* by breathing in the organism when the urine, respiratory secretion, or dried feces of infected birds is aerosolized (i.e., dispersed in the air as very fine droplets or dust particles). Other sources of exposure include mouth-to-beak contact, a bite from an infected bird, and handling the plumage and tissues of infected birds.

Person-to-person transmission of the disease is rare. It may occur when a person is exposed to infectious, aerosolized droplets from another person experiencing paroxysmal (sudden, very forceful) coughing during the acute illness.

When a person breathes in *Chlamydia psittaci* bacteria, the lungs' defense mechanisms attempt to neutralize them. The bacteria that avoid this defense start an infection that varies in severity from a mild flu-like illness to severe pneumonia. Generally, the signs and symptoms appear within 4 to 15 days after exposure. These include:

- Fever;
- Chills;
- Cough;
- Weakness or fatigue;
- Muscle and chest pain;
- Loss of appetite;
- Nausea;
- Vomiting;
- Diarrhea;
- Headache;

- Sweating; and
- Abnormal intolerance to light.

Psittacosis is primarily a lung disease but it can involve several organs. Some reports show that inflammation of the liver, lining of the heart cavity, the heart muscle, and the brain can occur. The course of the disease is variable and it can result in death. However, fatal cases are rare. In mild cases, fever may continue for three weeks or more. For accurate diagnosis of psittacosis, a doctor must know that the person has been exposed to birds and that the suspected birds are infected with *Chlamydia psittaci*. Laboratory examinations can identify the organism and detect the signs of infection. Patients who develop psittacosis require treatment with specific drugs. The disease is very responsive to tetracycline but is resistant to penicillin.

Preventive measures include feeding birds properly, avoiding overcrowding, and adequate ventilation systems. Clean cages are also important.

3.6.11.5 STINGING INSECTS

Nearly everyone has been stung by an insect at one time or another. It is an unpleasant experience that people hope not to repeat, but for most people the damage inflicted is only temporary pain. Only a very limited portion of the population (one to two people out of 1,000) is allergic or hypersensitive to bee or wasp stings. This section is about stings from Africanized bees, bees and wasps, but the information also pertains to stings from fire ants as well.

Stinging insects are limited to the order Hymenoptera, which includes wasps, bees, and ants. The stinger is a modified egg-laying apparatus, so only females can sting. Most hymenopterans live solitary lives and their behavior is more likely to be flight than fight. Social hymenopterans, including yellow jackets, bumble bees, honey bees, and fire ants, have individuals in the colony whose task it is to defend the nest. If the nest is disturbed, these individuals will defend it vigorously. In addition, foraging members of the colony will also sting if they are disturbed or injured as they go about their activities. Some, such as the yellow jacket, are much more liable to attack than others.

The Africanized honeybee is closely related to the European honeybee, which is used in agriculture for crop pollination and honey production. The two types of bees look the same and their behavior is similar in many respects. Neither is likely to sting when gathering nectar and pollen from flowers, but both will sting in defense if provoked.



An individual Africanized bee can sting only once and has the same venom as the European honeybee. However, Africanized honeybees are less predictable and more defensive than European honeybees. They are more likely to defend a greater area around their nest, and they respond faster and in greater numbers than the European honeybee.

Single Stings

Stingers are effective weapons because they deliver venom that causes pain when injected into the skin. The major chemical responsible for the pain of a honey bee sting is called melittin; it stimulates the nerve endings of pain receptors in the skin. The result is a very painful sensation, which begins as a sharp pain that lasts a few minutes and then becomes a dull ache. Even up to a few days later, the tissue may still be sensitive to the touch.

The body responds to stings by liberating fluid from the blood to flush venom components from the area. This causes redness and swelling at the sting site. If this is not the first time that the person has been stung by that species of insect, it is likely that the immune system will recognize the venom and enhance the disposal procedure. This can lead to very large swelling around the sting site or in a whole portion of the body. The area is quite likely to itch. Oral and topical antihistamines should help prevent or reduce the itching and swelling. Try not to rub or scratch the sting site, because microbes from the surface of the skin could be introduced into the wound and result in an infection.

When the sting is caused by a honeybee, the stinger usually remains in the skin when the insect leaves because the stinger is barbed. Remove the stinger as quickly as possible because venom continues to enter the skin from the stinger for 45 to 60 seconds following a sting. Much has been written about the proper way to remove a bee stinger, but new information indicates that it doesn't matter how you get it out as long as it is removed as soon as possible. If removed within 15 seconds of the sting, the severity of the sting is reduced.

After the stinger is removed, wash the wound and treat it. Several over-the-counter products or simply a cold compress can be used to alleviate the pain of a sting. Aerosol or cream antihistamine preparations that contain a skin coolant can also help. If the sting is followed by severe symptoms, or if it occurs on the neck or mouth, seek medical attention immediately because swelling in these areas of the body can cause suffocation.

Anaphylaxis

A small percentage of the population is allergic to wasp or bee stings. If you suspect that you or a fellow worker might be allergic or is developing an allergy, go to a physician or allergist for testing. Allergic reactions to bee and wasp stings can develop anywhere on the body and may include non-life-threatening reactions such as hives, swelling,

nausea, vomiting, abdominal cramps, and headaches. Life-threatening reactions such as shock, dizziness, unconsciousness, difficulty in breathing, and laryngeal blockage resulting from swelling in the throat require immediate medical care. Symptoms can begin immediately following the sting or up to 30 minutes later and may last for hours.

In allergic persons, venom components circulating in the body combine with antibodies that are associated with mast cells resting on vital organs. The mast cells release histamine and other biologically active substances. This results in a leakage of fluid out of the blood and into the body tissues. Blood pressure drops dangerously low and fluid builds up in the lungs. If this response is not reversed within a short time, the patient may die of anaphylactic shock.

Anaphylaxis, if treated in time, usually can be reversed by the effects of epinephrine (adrenaline) injected into the body. Individuals who are aware that they are allergic to stings should carry epinephrine in either a normal syringe (sting kit) or in an auto-injector (Epi-Pen) whenever they think they may encounter stinging insects. Epinephrine is obtainable only by prescription from a physician. Antihistamines potentially have value in combating non-life-threatening reactions, but should be used according to a physician's instructions.

Another method of combating anaphylaxis is desensitization. In this approach, the patient is subjected to injections of the venom to which he or she is allergic in increasing doses over a period of time. Like hay fever shots, the tactic is to build up a protective concentration of antibodies in the blood that will intercept and tie up the venom components before they can reach the antibodies on the mast cells. Desensitization with pure venom works about 95 percent of the time.

Multiple Stings

Occasionally, a person becomes involved in a situation where he or she is stung many times before being able to flee from the nesting site. Depending on the number of stings, the person may just hurt a lot, feel a little sick, or feel very sick. Humans can be killed if stung enough times in a single incident. With honeybees the toxic dose (LD50) of the venom is estimated to be 8.6 stings per pound of body weight. Obviously, children are at greater risk than adults. In fact, an otherwise healthy adult would have to be stung over 1,000 times to be in risk of death. Most deaths caused by multiple stings have occurred in men in their 70s or 80s who were known to have poor cardiopulmonary functioning.

Renal Insufficiency

A second, potentially life-threatening result of multiple stings occurs days after the incident. Proteins in the venom act as enzymes: one dissolves the cement that holds body cells together, while another perforates the walls of cells. This

damage liberates tiny tissue debris that would normally be eliminated through the kidneys. If too much debris accumulates too quickly, the kidneys become clogged and the patient is in danger of dying from kidney failure. It is important for persons who have received many stings at one time to discuss this secondary effect with their doctors. Wasp stings are as potent in this respect as bee stings. Patients should be monitored for a week or two following an incident involving multiple stings to be certain that no secondary health problems arise.

Avoiding Stings

Bees and wasps can be attracted to, or may react to, odors in the environment. It is best not to use perfume, cologne, or scented soaps if you are going into an area of bee or wasp activity. Unless someone accidentally collides quite hard with or swats at a bee or wasp, it is not likely to sting. Avoid going barefoot in vegetation, especially clover and blooming ground covers. Also avoid wearing brightly colored or patterned clothing. If you remain calm when a bee or wasp lands on your skin to inspect a smell or to get water if you are sweating heavily, the insect will eventually leave of its own accord. If you don't want to wait for it to leave, gently and slowly brush it away with a piece of paper. When swimming in pools, watch out for bees or wasps trapped on the surface of the water. If you find bees or wasps in the water, it is best to remove them to avoid being stung.

Stinging incidents often occur when nesting areas of social insects are disturbed. Be observant of the area around you. If you see insects flying to and from a particular place, avoid it. If you are going to be in an area where disturbing a nest is likely, wear long pants and a long-sleeved shirt. It might be a good idea to carry a military surplus, collapsible mosquito/gnat veil with you. Stinging insects often fly around the top of their targets. Because stings in the face can be disorienting, put on the veil, or pull a portion of your shirt over your head, and run away. Be sure that you can see where you are going!

Potential Nesting Sites:

- Empty boxes, cans, or other containers;
- Old tires;
- Infrequently used vehicles;
- Lumber piles;
- Holes and cavities in fences;

- Trees or the ground;
- Sheds, garages, and other outbuildings;
- Low decks and spaces under buildings; and
- Utility meter cabinet/boxes.

Bee-Proofing Your Facility:

- Remove all possible nesting sites around the facility;
- Inspect outside walls and eaves of offices and outbuildings;
- Seal openings larger than 1/8" in walls;
- Install fine screens (1/8" hardware cloth) over tops of rainspouts, vents and openings in and around utilities boxes; and
- From spring to fall check once or twice a week for bees entering or leaving the same area of your building or out buildings.

As a general rule, stay away from all honeybee swarms and colonies. If bees are encountered, get away quickly. While running away, try to protect face and eyes as much as possible. Take shelter in a car or building. Water or thick brush does not offer enough protection. Do not stand and swat bees; rapid motion will cause them to sting.

3.6.11.6 RABIES

Rabies is a deadly disease caused by a virus that attacks the central nervous system of warm-blooded animals (mammals). Once symptoms appear, rabies is almost always fatal. All animals that get the rabies disease die. If left untreated, rabies is fatal to humans.

Rabies is spread from an infected animal to another animal or person by saliva. This could happen through biting, contact with an open wound, or contact with a mucus membrane (mouth, nasal cavity, eyes).

The rabies virus moves from its entry point to the central nervous system by multiplying inside nerve cells. Rabies quickly multiplies once it reaches the brain. The resulting brain damage brings on the clinical signs of the disease. The virus then moves out to the salivary glands and other parts of the body. Animals can be infectious for days before showing any clinical signs of the disease.

Any mammal can carry rabies, but wild animals carry the highest risk of being rabid. Skunks, raccoons, foxes, and bats are the most common carriers. Beavers, rabbits, chipmunks, squirrels, rats and mice are less likely to be rabid.

Rabid animals appear to act differently than normal. The following are examples of suspicious behaviour:

- Wild animals seem friendly or tame;
- Normally nocturnal animals are active during the day;
- Wild animals do not run away when approached by a human or domestic animal;
- Animals' normal instinctive self-preservation is contradicted by their actions;
- Animals exhibit signs of excitement, meanness, or aggressive behavior;
- Animals with paralyzed hind legs stagger;
- Animals have drooping heads; and
- Pets seem to have a hard time walking, eating, or drinking.

If you are bitten or scratched by any animal or get saliva from a rabies-suspect animal into an open wound or onto a mucous membrane, wash the wound thoroughly with soap and water, seek medical attention immediately, and call Animal Control. Preserve the dead animal by refrigeration as soon as possible. Report bites to the Public Health Department immediately. Disinfect any surface contaminated with tissues or fluids from a rabies-suspect animal with 10% solution of household bleach in water (one part bleach to nine parts water).

Contact with a bat in a closed room can be dangerous. Contact the Public Health Department for guidance.

A dog, cat, or other domestic animal inflicting a bite should be observed for 10 days after the incident. As long as the animal remains healthy for that period, no risk of transmission exists. If the animal develops signs of rabies or belongs to a wildlife or exotic species, it must be euthanized humanely and arrangements made for the rabies examination. If

the animal dies during the 10-day period, a rabies examination should be performed. Bats and rabies-suspect terrestrial carnivores should be presumed rabid until confirmed negative by laboratory diagnosis, and, therefore, require urgent and careful handling.

3.6.11.7 WEST NILE VIRUS

The West Nile virus (WNV) is a virus transmitted by mosquitoes to other animals through a mosquito bite. The virus is commonly found in Africa, West Asia, and the Middle East. It was first reported in the United States in New York State in the summer of 1999. As of January 11, 2005, it had been detected in 49 States and the District of Columbia in the United States. The geographic range of WNV detection within the United States has expanded each year. The WNV normally cycles between mosquitoes and birds. However, if a person or animal is bitten by a WNV-infected mosquito, the virus may be transmitted to them. In the United States in 2001, thousands of wild birds, more than 700 horses, and 66 people were infected with severe cases of WNV. Severe illness due to WNV infection is rare in humans.

Most human WNV infections cause either no symptoms or a mild flu-like illness. The most severely affected patients may develop an inflammation of the brain called encephalitis. These severe cases are very rare in humans. While in 2004 there were 88 WNV deaths in the United States. Persons over age 50 are at higher risk of severe illness following infection.

Workers at risk of exposure to WNV include those working outdoors when mosquitoes are actively biting. Occupations at risk include farmers, foresters, landscapers, groundskeepers, painters, roofers, pavers, construction workers, and other outdoor workers. The most likely route of WNV infection to humans is through the bite of an infected mosquito. WNV may also be transmitted by organ transplantation, blood transfusion, or breast milk. No evidence exists that health care, animal husbandry, or other workers are at risk of infection from exposure to animals or humans infected with WNV. Person -to-person or animal-to -person transmission of WNV is not known to occur. In a recent study, workers in direct contact with sick geese were at increased risk of infection with WNV. Whether this was due to direct contact with the birds or to increased exposure to infected mosquitoes is unknown. No evidence exists that WNV can be transmitted from sick horses to humans. It is recommended that workers use standard infection control precautions when working with laboratory specimens or with humans or animals suspected or known to be infected with WNV. Also wear gloves if it is necessary to handle dead animals.

Recommendations for Workers

Outdoor workers can decrease their risk of WNV infection by reducing their contact with mosquitoes through the use of the personal protective measures listed below.

Workers may take the following steps when working at sites where mosquitoes may be actively biting:

- Wear long-sleeved shirts, long pants, and socks when possible. Spray exposed skin with insect repellents;
- **READ AND FOLLOW LABEL DIRECTIONS FOR REPELLENT USE;**
- Use repellents at the lowest effective concentration;
- Use DEET (N-N-diethyl-3-methylbenzamide or N,N-diethylmetatoluamide) at concentrations of 35% or less;
- Do not apply repellents to cuts, wounds, or irritated skin;
- When needed, reapply repellents according to label directions;
- Spray clothing with products containing DEET or permethrin, as mosquitoes may bite through thin clothing;
- Wash treated clothing before wearing it again;
- Do not apply repellents under clothing; and
- Follow standard infection control procedures when handling sick or dead animals or laboratory specimens to minimize the risk of infectious disease.

3.6.11.8 BLOOD BORN PATHOGENS

Approximately 5.6 million American workers are at risk of developing various types of illnesses, such as the human immunodeficiency (HIV) and hepatitis B (HBV) viruses, due to their exposure to bloodborne pathogens and other potentially infectious materials in the workplace. In recent years there has been a significant increase in the number of cases reported. This poses a serious problem for exposed workers and their employer. This standard practice instruction establishes uniform requirements to ensure that procedures to limit the spread of such hazards are implemented, evaluated, and that the proper hazard information is transmitted to all affected workers.

Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Where occupational exposure remains after institution of these controls, personal protective equipment shall also be used. Engineering controls shall be examined and maintained or replaced on a regular schedule to ensure their effectiveness. This schedule will be posted and documented.

Trihydro will provide hand-washing facilities that are readily accessible to employees. When provision of hand-washing facilities is not feasible, this employer shall provide an appropriate hand cleanser in conjunction with clean cloth/paper towels or antiseptic towelette. When antiseptic cleansers or towelette are used, hands shall be washed with soap and running water as soon as feasible. Also, employees shall wash their hands immediately or as soon as feasible after removal of gloves or other personal protective equipment. Employees will wash their hands and any other skin with soap and water, or flush mucous membranes with water immediately or as soon as feasible following contact of such body areas with blood or other potentially infectious materials.

3.6.11.9 SNAKES

Snakes are reptiles. Reptiles are cold-blooded, have skin covered with scales, and lay eggs. (Some snakes don't actually lay their eggs, but hold them inside until they hatch.) Snakes have no legs and no ears. Skilled predators, snakes help maintain the balance of nature by eating prey that reproduces frequently, everything from earthworms to rabbits. Snakes are especially important in the control of rodents such as mice and rats.

There are 21 species of snakes native to North Eastern United States and 3 of those species are venomous. Here is a description of the different venomous snakes:



Northern Copperheads are medium-sized snakes. Adults typically range in length from 26 to 42 inches. The copperhead was aptly named because its most distinctive feature is the copper or bronze-colored top and sides of the head.



Timber Rattlesnakes have two color patterns which are commonly found: a yellow phase, which has black or dark brown crossbands on a lighter background color of yellow, brown, or gray; and a black phase, which has dark crossbands on a dark background. Black or dark brown stippling also occurs to varying degrees, to the extent that some individuals appear all black. Scales are ridged, giving this rattlesnake a rough-skinned appearance. The timber rattler has a broadly-triangular head with many small scales on the crown of the head bordered by a few large scales.



Massasauga Rattlesnakes are usually two to three feet in length. The massasauga has chocolate-brown backsaddles and triple rows of brownish-black side patches, which merge with a marbled dark gray or black belly. Body patches appear edged in black. The tail has five to seven dark cigarband rings and is tipped by a grayish-yellow rattle. The head is flattened and broad with one white and three dark stripes radiating from its face. Nine enlarged plate scales helmet its head. The timber rattler lacks these large plates and has only small random shaped head scales. In addition, the tail of the timber rattlesnake is solid black just forward of its rattle.

Preventing Snake Bites

Watching where you step, put your hands, or sit down are the best ways to prevent snake bites. Poisonous snakes live on or near the ground and often like rocks, wood piles, and other spots that offer both a place to sun and a place to hide. Snakes avoid humans, but will definitely bite if stepped on or otherwise trapped. Most bites occur in and around the ankle. About 99 percent of all bites occur below the knee, except when someone accidentally picks up or falls on a snake.

The fangs of venomous snakes, though long and sharp, are relatively fragile and easily deflected or broken. These fangs usually don't penetrate canvas tennis shoes and almost never penetrate leather shoes or boots. Watching where you step and wearing boots in tall grass can prevent most snake bites.

Snakes are not something to be feared, but rather a creature to be respected as a fascinating member of the outdoors.

Preventing Snake Bites

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Prehospital Care

Do nothing to injure the patient or impede travel to the Emergency Facility.

- Support the airway, breathing, and circulation per advanced cardiac life support (ACLS) protocol with oxygen, monitors, large-bore intravenous lines, and fluid challenge. Minimize activity (if possible), remove jewelry or tight-fitting clothes in anticipation of swelling, and transport the patient to the emergency facility as quickly and safely as possible. Every 15 minutes, use a pen to mark and time the border of advancing edema.
- In recent studies, no benefit was demonstrated when a negative pressure venom extraction device was evaluated; additional injury can result. Incision across fang marks is not recommended. Mouth suction is contraindicated.
- Lymphatic constriction bands and pressure immobilization techniques may inhibit the spread of venom, but whether they improve outcome is not clear. These techniques may actually be deleterious for pit viper envenomation if they increase local necrosis or compartment pressure. Tourniquets are not recommended.
- Maintain the limb in a neutral position.

- First aid that lacks therapeutic value or is potentially more harmful than the snakebite includes electric shock, alcohol, stimulants, aspirin, ice application, and various folk and herbal remedies. Cost and risk of acute adverse reactions generally preclude field use of antivenom. Attempts to capture or kill the snake are not recommended because of the risk of additional injury. If the venomousness of a particular snake is uncertain, consider taking photographs of the snake from a safe distance of at least 6 feet away using a digital or polaroid camera.
- Emergency department care: adequate hydration with intravenous fluids is indicated. Patients with hypotension should be resuscitated first with two isotonic sodium chloride solution challenges (e.g., 20 mL/kg). Treat persistent shock with colloids, followed by pressors as indicated.

Grading envenomations is a dynamic process; administer additional antivenom as indicated by a worsening clinical course. When considering the use of antivenom, the risk of allergy to antivenom must be weighed against the benefits of reducing venom toxicity.

- Nonenvenomation (ie, dry bite)
 - o Local effects - Puncture wounds only
 - o Systemic effects – None
 - o Coagulation abnormalities - No laboratory evidence of coagulation abnormalities and no clinical evidence of abnormal bleeding or clotting
- Minimal or mild envenomation
 - o Local effects - Swelling, pain, tenderness, and/or ecchymosis confined to the immediate bite area
 - o Systemic effects - None
 - o Coagulation abnormalities - No laboratory evidence of coagulation abnormalities and no clinical evidence of abnormal bleeding or clotting
- Moderate envenomation
 - o Local effects - Swelling, pain, tenderness, and/or ecchymosis extending beyond the immediate bite area, but involving less than the entire part

- o Systemic effects - Present but not life threatening; may include nausea, vomiting, oral paresthesias or unusual tastes, fasciculations (myokymia), mild hypotension (systolic blood pressure <90 mm Hg), mild tachycardia (heart rate <150 bpm), and tachypnea
- o Coagulation abnormalities - Laboratory evidence of coagulation abnormalities may be present, but no clinical evidence of abnormal bleeding or clotting exists; rattlesnake venom–induced coagulopathies commonly include thrombocytopenia, decreased fibrinogen, and/or elevated PT
- Severe envenomation
 - o Local effects - Swelling, pain, tenderness, and/or ecchymosis extending beyond the entire extremity or threatening the airway
 - o Systemic effects - May include severe hypotension or shock, severe tachycardia or tachypnea, respiratory insufficiency, and/or severe altered mental status
 - o Coagulation abnormalities - Markedly abnormal with serious bleeding or severe threat of bleeding

Consultations:

- The American Association of Poison Control Centers may assist in the management of envenomations.
- For assistance in treating snakebitten patients with Crotaline Fab antivenom (CroFab), contact the CroFab hotline at 87-SERPDRUG (877-377-3784).
- Consider consulting a surgeon (e.g., general, orthopedic, hand) if compartment syndrome is suspected.

3.6.11.10 SPIDERS

Only a few spiders are dangerous to humans.

- The black widow (*Lactrodectus mactans*) is known for the red hour glass marking on its underside.
- The brown recluse is about one inch long and has a violin shaped mark on its upper back.

Spiders prefer warmer climates and dark dry places where flies are plentiful. For these reasons, they often live in outdoor toilets. If possible, it is best to capture the spider for identification.

Bites from spiders may feel like a pinprick and may not even be noticed, but within hours, swelling at the site and breathing problems may occur. Emergency help should be immediately sought. A cloth dampened with cold water or filled with ice may be applied to the bite while awaiting help.

4.0 EMERGENCY RESPONSE

Emergency response shall be carried out immediately whenever there is a personal injury, fire, or explosion. Any field team member that sights or suspects a fire or explosion shall notify the Trihydro Project Manager immediately. A first aid kit and fire extinguisher will be maintained onsite.

Trihydro employees shall be familiar with the emergency procedures at the job site. Site workers will be instructed to immediately shut down all sources of ignition and leave the area when an emergency is observed.

The following information is provided in the event of an emergency.

Emergency Service Organization	Telephone
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Local Emergency Services

Police Emergency/Station.....	911/301-565-7744
Fire Department Emergency/Station	911/301-434-2400
Ambulance Emergency/Station	911
Hospital.....	301-754-7000
Poison Control	800-222-1222
Safety-Kleen Corporation Emergencies	800-468-1760

Company Contacts

Risk Management (after hours)	307-760-1849
Safety Coordinator (after hours).....	307-760-8269

Client Contacts

Gary Risse	678-428-5308
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Federal/Government Contacts

EPA Hotline.....	800-621-8431
NIOSH Hotline	800-356-4674
Occupational Safety and Health Administration (OSHA).....	202-219-8148

OSHA Hotline	800-321-6742
National Response Center (report spills and chemical releases)	800-424-8802
Chemtrex (24 hour emergency information)	800-255-3924
Department of Transportation Safety Administration	888-327-4236

A map showing the location of the nearest hospital is shown on Figure 1.

4.1 INCIDENT AND ACCIDENT REPORTING

Trihydro employees shall report, in writing, to the Trihydro's Corporate Health and Safety Office, any incident or near miss resulting in personal or public injury, environmental impact, or property damage to a Safety-Kleen Corporation operated site, materials, or equipment, including motor vehicles owned by Trihydro, its subcontractors, or Safety-Kleen Corporation. All reports shall be completed as soon as possible. A copy of the near miss report form can be found in Appendix B.

An incident resulting in the following near miss is an event that given a change in time or position could have resulted in an incident.

- Environment (e.g. spills, releases, odor complaints, permit exceedences, RV operations, process upsets);
- Injury/Illness (e.g. injuries, illnesses, first aids, recordables, lost workday cases, fatalities, non-injuries – document only, non-occupational);
- Property Damage / Loss (e.g. fires, explosions, loss of well control, business interruptions, abnormal operations, production loss / reduction);
- Quality (e.g. customer complaints, contaminations, off specification);
- Security (e.g. vandal – damages, burglaries, break & enters, robberies, thefts, public disturbances, trespasses); and
- Vehicle (e.g. vehicle accidents, cars/pickups/trucks, barges/boats/ships, aircraft, rail cars, tankers/transport, cranes/drotts/fork trucks).

Incident and accident reporting is very important for the following reasons:

- Collects information that Trihydro can use to calculate statistics and other information for tracking accident trends;

- Helps identify training needs, problems with work procedures, and needs for personal protective, safety, and emergency equipment;
- Collects information necessary for completing investigation and insurance reports and complying with regulatory requirements; and
- Identifies weaknesses in company and site safety programs.

Reports of incidents or accidents should be prepared immediately after the event occurs. This is necessary to ensure important evidence is not lost or disturbed and details are not forgotten by those involved. Accident/Incident Investigation Report and Vehicle Accident or Loss Report forms can be found in Appendix A.

5.0 MONITORING PROCEDURES

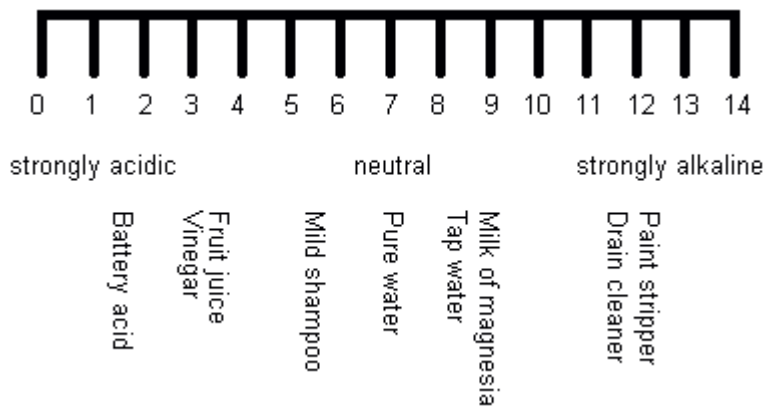
5.1 MEDICAL MONITORING PROGRAM

Site work is expected to involve active physical work and potential exposure, climatic stress, noise, and physical safety hazards common to environmental activities. The work will require people of reasonable health with normal vision and hearing acuity. The subcontracted companies involved with this project will be asked to provide documentation of employee medical fitness to perform the required work, evidenced by a signed document from the examining physician dated no later than one year prior to start up of the project. This documentation should also indicate each employee's ability to perform the required work while wearing an air-purifying respirator.

5.2 FIELD MONITORING PROGRAM

A flame ionization detector will be used at the site. The detector is a direct-reading monitoring device that ionizes gases and vapors with an oxyhydrogen flame and measures the differing electrical currents thus generated.

A pH meter will also be used at the site. A pH meter is a high impedance voltmeter for the measurement of electrode potential. The following graph explains the different pH levels.



6.0 RECORDKEEPING

Employees shall perform daily documented inspections of critical and operational safety items, correct any deficiencies found and report any corrective actions and deficiencies to Trihydro Corporate Health and Safety Department and the Safety-Kleen Corporation representative in writing.

The following documents and records will be maintained in the Trihydro Corporation project files:

- A copy of this plan;
- Field notes and field data pertaining to enforcement of health and safety practices; and
- Accident and illness reports.

7.0 SAFETY EQUIPMENT LIST

The following documents and materials will be brought to the project site by the Trihydro Project Manager before environmental activities commence.

7.1 SUPPORTING DOCUMENTATION

Trihydro Site Health and Safety Plan;
Material Safety Data Sheets (MSDS); and
NIOSH Pocket Guide to Chemical Hazards.

7.2 PERSONAL PROTECTIVE EQUIPMENT

Work gloves;
Foot protection;
Safety glasses;
Hard hats.

7.3 EQUIPMENT

Fire extinguisher (type ABC); and
First aid kit.

7.4 SUPPLIES

Distilled water;
Tape;
Soap;
Water;
Towels;
Buckets (5-gallon capacity; quantity: 3);
Brush; and
Eye washes.



TABLES

Table 1. Criteria for Selection of Personal Protection Level.

NOTE: Minimum PPE requirements for this site are specified in Section 3 of this plan.

Level of Protection	Equipment	Protection Provided	Should Be Used When	Limiting Criteria
A	<p>RECOMMENDED:</p> <ul style="list-style-type: none"> - Pressure demand, full facepiece SCBA or pressure demand supplied air respirator with escape SCBA. 	<ul style="list-style-type: none"> - The highest available level of respiratory, skin, and eye protection. 	<ul style="list-style-type: none"> - The chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either: 	<ul style="list-style-type: none"> - Fully encapsulating suit material must be compatible with the substances involved.
	<ul style="list-style-type: none"> - Fully encapsulating chemical-resistant suit. - Inner chemical-resistant gloves. - Chemical resistant safety boots/shoes. - Two way radio communications. <p>OPTIONAL:</p> <ul style="list-style-type: none"> - Cooling unit. - Coveralls. - Long cotton underwear. - Hard hat. - Disposable gloves and boot covers. 			

Level of Protection	Equipment	Protection Provided	Should Be Used When	Limiting Criteria
B	<p>RECOMMENDED:</p> <ul style="list-style-type: none"> - Pressure demand, full facepiece SCBA or pressure demand supplied air respirator with escape SCBA. - Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one- or two-piece chemical splash suit; disposable chemical resistant one piece suit). - Inner and outer chemical resistant gloves. - Chemical resistant safety-boots/shoes. - Hard hat. - Two way radio communication. <p>OPTIONAL:</p> <ul style="list-style-type: none"> - Coveralls. - Disposable boot covers. - Face shield. - Long cotton underwear. 	<p>The same level of respiratory protection but less skin protection than Level A.</p> <p>It is the minimum level recommended for initial site entries until the hazards have been further identified.</p>	<ul style="list-style-type: none"> - The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection. This involves atmospheres: <ol style="list-style-type: none"> 1 with IDLH concentrations of specific substances that do not represent a severe skin hazard or 2 that do not meet the criteria for use of air-purifying respirators. <ul style="list-style-type: none"> - Atmosphere contains less than 19.5 percent oxygen. - Presence of incompletely identified vapors or gases is indicated by direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the intact skin. 	<ul style="list-style-type: none"> - Use only when the vapor or gases present are not suspected of containing high concentrations of chemicals that are harmful to skin or capable of being absorbed through the intact skin. - Use only when it is highly unlikely that the work being done will generate either high concentrations of vapors, gases, or particulates, or splashes of material that will affect exposed skin.
C	<p>RECOMMENDED:</p> <ul style="list-style-type: none"> - Full facepiece, air purifying, canister-equipped respirator. - Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one- or two-piece chemical splash suit; disposable chemical resistant one piece suit). 	<p>The same level of skin protection as Level B, but a lower level of respiratory protection.</p>	<ul style="list-style-type: none"> - The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any exposed skin. - The types of air contaminants have been identified, concentrations measured, and a canister is available that can remove the contaminant. 	<ul style="list-style-type: none"> - Atmospheric concentration of chemicals must not exceed IDLH levels. - The atmosphere must contain at least 19.5 percent oxygen.

Level of Protection	Equipment	Protection Provided	Should Be Used When	Limiting Criteria
C (continued)	<p>Inner and outer chemical resistant gloves.</p> <ul style="list-style-type: none"> - Chemical resistant safety boots/shoes. - Hard hat. - Two way radio communication. <p>OPTIONAL</p> <ul style="list-style-type: none"> - Coveralls. - Disposable boot covers. - Face shield. - Escape mask. - Long cotton underwear. 		<ul style="list-style-type: none"> - All criteria for the use of air-purifying respirators are met. 	
D	<p>RECOMMENDED:</p> <ul style="list-style-type: none"> - Coveralls. - Safety boot/shoes. - Safety glasses or chemical splash goggles. - Hard hat. <p>OPTIONAL:</p> <ul style="list-style-type: none"> - Gloves. - Escape mask. - Face shield. 	<p>No respiratory protection. Minimal skin protection.</p>	<ul style="list-style-type: none"> - The atmosphere contains no known hazard. - Work functions preclude splashes, immersion, or the potential for unexpected inhalation or contact with hazardous levels of any chemicals. 	<ul style="list-style-type: none"> - This level should not be used in the exclusive Zone. - The atmosphere must contain at least 19.5 percent oxygen.

Table 2. Personal Protective Equipment Requirements.

Task	Personnel	Respirator	Tyvek Coveralls	Chemically Resistant Gloves	Chemically Resistant Boots	Safety Glasses	Splash Goggles	Ear Plugs/ Muffs	Safety Helmet
Excavation Operations	Contractor Crew	Available for use	Yes ^{1,2}	Yes ¹	Yes ¹	Yes	Available for use	Available for use	Yes
	Engineer/Chemist	Available for use	Available for use	Available for use	Yes ¹	Yes	Available for use	Available for use	Yes
	Surveyors	Available for use	Available for use	Available for use	Yes ¹	Yes	Available for use	Available for use	Yes
Decontamination Operations	Sampling Team	Available for use	Available for use	Yes	Yes	Yes	Available for use	Yes	Yes
Soil Gas and Liquid Sampling	Sampling Team	Available for use	Available for use	Available for use	Yes	Yes	Available for use	Available for use	Yes

¹ Not required if soil or water is not visibly contaminated, if PID measurements of the soil samples are below 1000 ppm, and if pH measurements are between 2 and 12 standard units.

² Coveralls are to be taped to gloves and boots to minimize exposure pathways to contaminants.

Table 3 Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)

	Actual Temperature Reading (F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
Estimated Wind Speed (in mph)	Equivalent Chill Temperature (F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER In < hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
	Trenchfoot and immersion foot may occur at any point on this chart.											

* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

Table 4. Chemicals Which May Be Associated with Operations at a Safety-Kleen Corp. Service or Recycling Center.

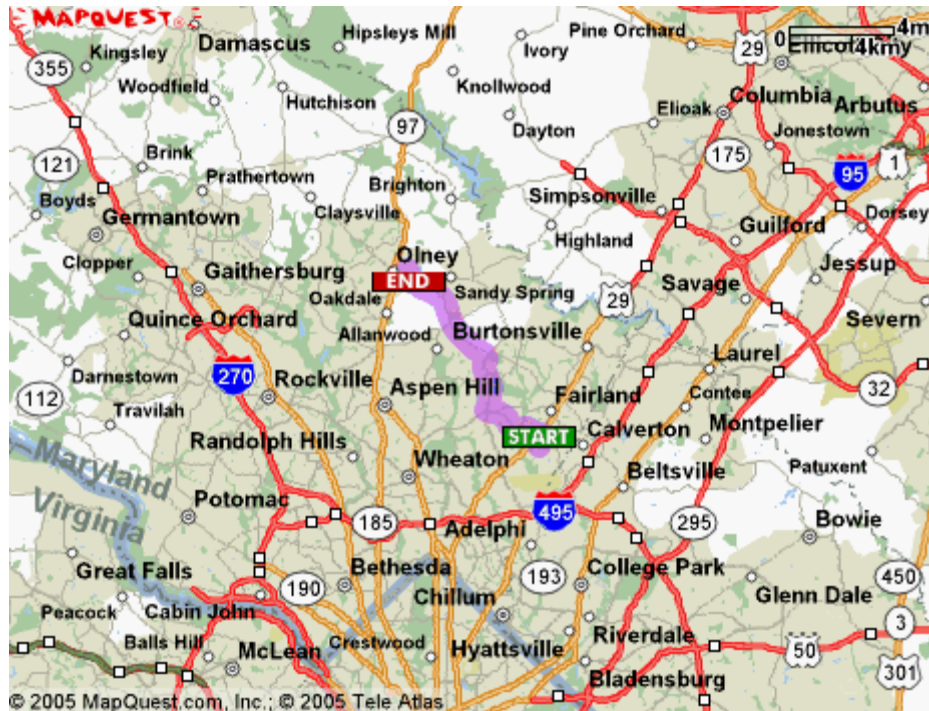
Volatile Organic Compounds	Semi-Volatile Organic Compounds	Inorganic Constituents	Facility-Related Chemical Names
Acetone	Cresylic acid	Cadmium	Carburetor cleaner
Chlorobenzene	Isophorone	Chromium	Cold parts cleaner
1,2-Dichlorobenzene	Naphthalene	Lead	Dry cleaning solvent
1,4-Dichlorobenzene	Phenols	Other heavy metals	Heavy aromatic naphtha
1,1-Dichloroethane			C9-C13 hydrocarbons
1,1-Dichloroethene			Immersion cleaner
1,2-Dichloroethene			Lacquer thinner
Cis-1,2-Dichloroethene			Mineral spirits
Trans-1,2-Dichloroethene			Petroleum naphtha
Ethylbenzene			Paint gun cleaner
Methylene chloride			Paint thinner
Methyl ethyl ketone			Parts washing solvent
Tetrachloroethene			Spent mineral spirits
Tetrahydrofuran			Stoddard solvent
Toluene			Waste paint thinner
1,1,1-Trichloroethane			
Trichloroethene			
1,2,3-Trimethylbenzene			
1,2,4-Trimethylbenzene			
1,2,5-Trimethylbenzene			
Vinyl chloride			
Xylenes			

Notes:

- 1 Trihydro Corporation developed this list of chemicals based on constituents which have been detected during site assessments at numerous S-K service centers. The MSDSs presented in Appendix B list the chemicals and hazards associated with products which may be managed at a S-K service center. Trihydro Corporation makes no claim or assumes no liability that this list is a complete summary of chemicals which may be encountered at a S-K service center.

FIGURE

Figure 1 **Route from Former Safety-Kleen Corporation Service Center to Holy Cross Hospital**



From: 12164 Tech Rd Silver Spring, MD 20904-1914 US

To: Holy Cross Hospital 1500 Forest Glen Rd Silver Spring, MD 20910 US

Driving Directions

1. Start out going **NORTHWEST** on **TECH RD** toward **PROSPERITY DR**. (0.14 miles)
2. Turn **LEFT** onto **US-29 S/COLUMBIA PIKE**. Continue to follow **US-29 S**. (3.86 miles)
3. Merge onto **CAPITAL BELTWAY/I-495 W** toward **NORTHERN VIRGINIA/BETHESDA**. (1.36 miles)
4. Merge onto **MD-97 N/GEORGIA AVE** via **EXIT 31**. (0.28 miles)
5. Turn **RIGHT** onto **FOREST GLEN RD**. (0.52 miles)
6. End at Holy Cross Hospital 1500 Forest Glen Rd Silver Spring, MD 20910 US

Total Estimated Time: 11 minutes

Total Distance: 6.17 miles

APPENDIX A

ACCIDENT/INCIDENT INVESTIGATION REPORT
AND
VEHICLE ACCIDENT OR LOSS REPORT

Trihydro Corporation
Accident/Incident Investigation Report

Project Number: _____ Date of Occurrence: ____/____/____ Time: _____AM/PM

Location: _____ ☐ On site ☐ Off site

Type of Accident/Incident: ☐ Injury/Illness ☐ Property ☐ Vehicle ☐ Radiological ☐ Environmental

Type of Investigation: ☐ Hospital ☐ First Aid ☐ Near Miss ☐ MVA ☐ Contamination ☐ Fire ☐ Other

Individual(s) Involved/Injured/Witnesses/Employee or Non-Employee:

Name	Occupation	Hospital, if transported	Life #/ID	Telephone	Organization	Supervisor

Have any other incident report(s) been made? ☐ Yes ☐ No If yes, please attach copy.

OSHA Information (Injury/Illness):

☐ Injury ☐ Skin Disease or Disorder
☐ Dust Diseases of the Lungs ☐ Poisoning
☐ Disorders from Physical Agents ☐ Disorders from Repeated Trauma
☐ All Other

Is this a Lost Work Case? ☐ Yes ☐ No
Death ☐ Yes ☐ No
Are there Multiple Victims? ☐ Yes ☐ No
Was Employee Hospitalized Overnight? ☐ Yes ☐ No
Has Employee Returned to Full Duty? ☐ Yes ☐ No

Experience on Job ☐ under 3 mos
☐ 3-12 mos ☐ over 12 mos

Property/Vehicle and/or Radiological or Environmental Losses:

Property Loss Type:

Fire/Smoke: ☐ Building ☐ Equipment ☐ Brush ☐ Vehicle ☐ Other
Electrical: ☐ Equipment Contact ☐ Wiring ☐ Overload ☐ Insulation ☐ Polarity ☐ Grounding ☐ Other
Explosion: ☐ Vapor ☐ Chemical ☐ Fluids ☐ Dust
Mechanical: ☐ Linear Energy ☐ Rotational Energy ☐ Pressure ☐ Falls ☐ Mechanical Breakdown ☐ Overload
Acts of Nature: ☐ Wind ☐ Rain/Hail ☐ Freezing rain ☐ Snow ☐ Lightning ☐ Earthquake ☐ Other
Leaks, Spills,
Releases, or
Contamination: ☐ Chemical ☐ Nuclear/Radiological ☐ Environmental Impairment/Impact ☐ Poisoning ☐ Other
Miscellaneous: ☐ Thermal Damage ☐ Corrosion ☐ Water Damage ☐ Sabotage ☐ Other

Vehicle Type: ☐ Company-owned ☐ Contractor-owned ☐ Personal/Private-owned ☐ Other

Light Highway: ☐ Automobile ☐ Van ☐ Pickup Truck
☐ Motorcycle, Moped ☐ Highway Vehicle ☐ Cushman-type
Heavy Highway: ☐ Bus ☐ Delivery Truck ☐ Dump Truck ☐ Semi ☐ Crane ☐ Truck
Construction Vehicles: _____
Other Vehicles: _____

Was vehicle equipped with seat belts? [] Yes [] No

Did vehicle accident involve a recordable injury? [] Yes [] No

Did equipment design or defect contribute to accident cause or severity? [] Yes [] No

Total Damage: \$_____ (if known)

Management Notification by _____ Date/Time: _____

Project Manager notified: _____

What was the **activity** in progress at the time of the accident/incident?

(using equipment, handling chemicals, etc.)

Describe the accident sequentially. beginning with initiating events. Tell what happened, how it happened, and finish with the nature and extent of injury or damage.

Name any objects or substances that contributed to this event and how they were involved.

Describe the nature of the incident (e.g., right shoulder strain, chemical spill, radiological contaminations, or vehicle accident).

Name of medical provider, if applicable _____

Hospital, only if admitted overnight _____

Accident Causes:

Conditions _____

Actions _____

Other _____

Corrective Actions: (If risk is acceptable, corrective actions may not be necessary. If so, indicate "Not Applicable").

Immediate Actions/Mitigated

Actions Recommended

Follow Up: Individuals Interviewed:

Name: _____ ID: _____ Date: _____ Org: _____
Name: _____ ID: _____ Date: _____ Org: _____
Name: _____ ID: _____ Date: _____ Org: _____

Is a critique and/or further investigation required? ☐ Yes ☐ No If yes, by
whom? _____

Has a separate investigation committee been assigned/charged? ☐ Yes ☐ No

Has this report been forwarded to Trihydro's Lessons Learned Coordinator? ☐ Yes ☐ No If yes, when? _____

Has the Trihydro's Director of Health and Safety been notified? ☐ Yes ☐ No

Report Prepared by _____ Date: _____

Employee's Signature _____ Date: _____

Project Manager's Signature _____ Date: _____

Director of Health and Safety Signature _____ Date: _____

Project Manager's

Notes: _____

INSTRUCTIONS FOR COMPLETING THIS INITIAL REPORT

Please Note: These are initial reports and should be used on a graded approach according to severity of the accident/incident and the needs of the cognizant organization.

1. The Project Number is required for your own use in tracking such reports.
2. Date of Occurrence, and Time refer to the actual date and time the incident occurred.
3. Be specific on Location by indicating the Project site location and area if known. Please indicate if incident occurred on or off site.
4. The Type of Accident/Incident requires a check mark. More than one type may be indicated.
5. The Type of Investigation should be dictated by the incident. Please check one.
6. Depending on the incident, more than one individual may be involved, with or without witnesses. If this is an investigation of an occupational injury/illness, continue up to the dotted line and skip over to the next page and continue. For all other incidents, please complete all pertinent information on all three pages.
7. If there have been other incident reports filed, such as an Employee's Injury/Illness Report or Accident, please check the box and attach copies if available.
8. OSHA Information should be completed for occupational injuries and illnesses only to the extent of your knowledge.
9. Property and Vehicle Type losses should also be completed to the extent of your knowledge. Only include damages that you know.
10. (PAGE TWO) Individuals involved in any of the incidents covered, are required to notify their management as soon as possible. On this form you should complete management notification information in the spaces provided.
11. Indicate what the actual activity was at the time the accident/incident occurred (e.g., The employee was purging the well outside Building 463.) This should be completed whether or not the activity had anything directly to do with the incident.
12. Describe what happened. Include those events leading up to the incident and conclude with the diagnosis, if known. (e.g., While digging, the blade of the shovel struck an unseen pipe, causing the employee to fall onto the left shoulder. The employee went to the clinic and x-rays revealed that the shoulder was fractured at the AC joint. A small quantity of some chemical from the ruptured pipe spilled onto the ground. Site personnel were notified to follow-up.)
13. Identify any objects that may have contributed to the incident (e.g., unseen pipe...not previously, nor obviously identified...)
14. Describe the nature of the incident (e.g., left shoulder fracture, chemical spill less than reportable quantity, lawnmower with broken shaft and blade).
15. Provide the names of the medical providers and hospital if known and applicable.
16. Evaluate the human, environmental, mechanical causes etc., for each incident. Indicate if any conditions caused the incident, directly or indirectly (e.g., unmarked and unseen pipe in the ground). Identify any unsafe acts, or other acts, which may have contributed (e.g., employee was not paying close attention to the area being worked in).
17. Factors that may have contributed (e.g., rain was forecast and employee was in a hurry...in fact, he had forgotten to wear his glasses and could not see the pipe).
18. What is being done to avoid recurrence of this accident/incident? Identify corrective measures taken to mitigate the incident and what further actions are recommended. Indicate also by whom.
19. (PAGE THREE) The next spaces are to identify those individuals interviewed. If more space is needed, please attach another sheet.
20. Should a special critique meeting be needed, or further investigation be required, check here.
21. Make sure that this paperwork is forwarded to Trihydro's Director of Health and Safety and Lessons Learned Coordinator.
22. Required signatures follow; if this involves an employee, the employee's signature is required.

VEHICLE ACCIDENT OR LOSS REPORT

INSTRUCTIONS

Complete report in detail and give to your supervisor. Supervisor is to send report immediately to Trihydro Corporation at 1252 Commerce Dr, Laramie, WY 82070. If accident is serious, call direct immediately (307) 745-7474.

Date of Accident _____ Time of Day _____ a.m. _____ p.m. _____
mm/dd/yy

Location _____

Please check all that apply.

Light Conditions: _____ Daylight;
_____ Darkness with street lights;
_____ Darkness without lights;
_____ Dusk or Twilight

Road Conditions: _____ Dry;
_____ Wet;
_____ Snowy or Icy;
_____ Other

Vehicle Speed: _____

Number of Vehicles Involved: _____
If more than 2, complete additional sheets.

Vehicle: Company _____ Rental _____

Year	Make	Model
------	------	-------

Vehicle ID Number: _____

Driver's Address: _____
(Print) Street City State/Zip

Date of Birth: _____ Sex _____ Driver's License State/Number _____
 (Print) Mo/Day/Year

Describe Nature of Damage to Vehicle or Equipment:

Cost to Repair	\$
----------------	----

Injuries: If you or any person was injured, give names/address and nature of injury.

No. 2

Show Repair Cost Here
\$ _____

Other Vehicle:

Year	Make	Model
------	------	-------

Vehicle

License Plate

Year	State	Number
------	-------	--------

Driver's Name:

(Print)

First	Middle	Last
-------	--------	------

Driver's Address:

(Print)

Street	City	State/Zip
--------	------	-----------

Phone No:

Date of Birth:

(Print)

Mo/Day/Year	Sex	Driver's License State/Number
-------------	-----	-------------------------------

Owner's Name:

(Print)

First	Middle	Last
-------	--------	------

Owner's Address:

(Print)

Street	City	State/Zip
--------	------	-----------

Parts of Vehicle Damaged:

Insurance Agent's Name:

Address:

Phone Number

Insurance Company

Witness:

Were Police Called:

_____ Yes _____ No

Officer's Name & Badge No.

Citation Issued:

_____ Yes _____ No

Receiver:

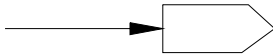
INDICATE ON DIAGRAM WHAT HAPPENED

Use one of these outlines to sketch the scene of your accident, filling in street or highway names or numbers.

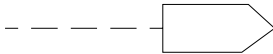
Number each vehicle and show direction of travel by arrow:

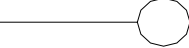


Use solid lines to show path before accident




dotted line after accident.



Show pedestrian by: 

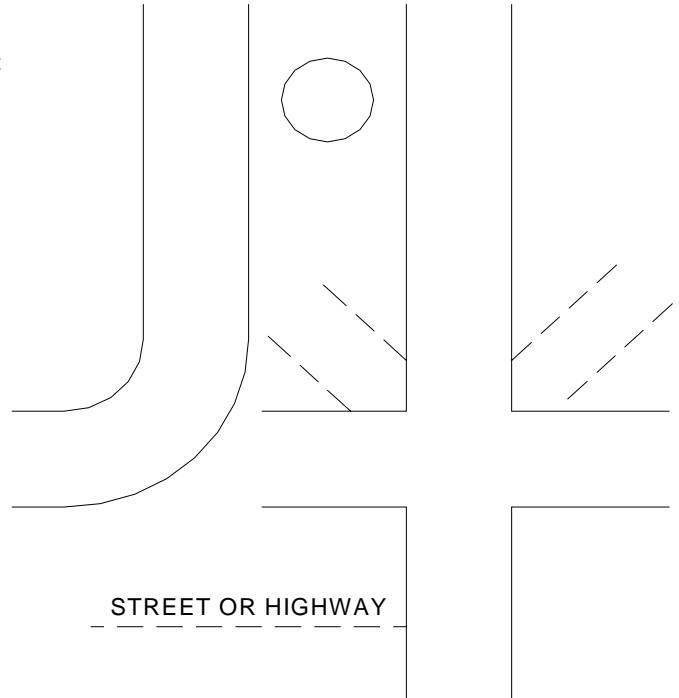
Show railroad by: 

Show distance and direction to landmarks; identify landmarks by name or number.

Indicate north by arrow, as: 

Show all traffic sign or traffic lights by proper location by marking an "X".

INDICATE NORTH BY ARROW



Describe what happened: _____

(In case of THEFT, list all items stolen and value of each item)

Reported: _____
 Verbally to: _____
 Phoned to: _____
 Date: _____

Driver: _____
 (Signature) (Date)

Supervisor: _____
 (Signature) (Date)

APPENDIX B

NEAR MISS REPORT

NEAR MISS REPORT

Please fill in **all** of the blanks. If you have any questions or need assistance please contact Todd Forry, Trihydro Health and Safety Director, at (307) 745-7474.

General Information

Incident Date: Time: AM/PM

Incident Type:

Work Type:

Organization:

Department:

Division:

Investigation Date: Time: AM/PM

Supervisor:

Supervisor's employer and email if not employed by Trihydro Corporation:

Worker:

Time at Present Job:

Worker's employer and email if not employed by Trihydro Corporation:

Employee Status: Full Time Part Time

Incident Location:

Incident Description:

Incident Reported To:

Injury and Illness Information

Employee's Specific Activities:

Equipment, Materials, or Chemicals Used:

Injury Description:

Body Part(s) Affected:

Treatment Provided:

Hospital:

Injury/Illness Onset Date: Time: AM/PM

Employee Missed Work? No Yes first day absent was (date)

Return To Work?	No	Yes on	Restricted Work	Yes	No
-----------------	----	--------	-----------------	-----	----

Other Injured? No Yes

Third Party Incident Information

Damage Description:

Name Of Owner:

Address:

Telephone Number:

Name of Witness 1:

Address:

Telephone Number:

Name of Witness 2:

Address:

Telephone Number:

No.	Root Cause and Contributing Factors (Describe in Detail Why Incident/Near Miss Occurred)

Root Cause(s) Analysis (RCA):	
1. Lack of skill or knowledge	5. Doing the job according to procedures or acceptable practices takes more time/effort
2. Lack of or inadequate operational procedures	6. Short-cutting procedures or acceptable practices is positively reinforced or tolerated
3. Inadequate communication of expectations regarding procedures or acceptable practices	7. In the past, did not follow procedures or acceptable practices and no incident occurred (injury, product quality incident, equipment damage, regulatory assessment, or production delay)
4. Inadequate tools or equipment	8. External Factors

Item No	RCA No	Solution(s): How to prevent questionable behavior from reoccurring	Person Responsible	Due Date	Completed

Results of Solution Verification & Validation:

Investigation Team

Position/Title

Primary Contact

Reviewed By

Position/Title

Date

Reviewer's employer and email if not employed by Trihydro Corporation: _____

APPENDIX C

PROJECT SITE SAFETY MEETING LOG

Trihydro Corporation

Project Site Safety Meeting Log

Job Name: _____

Job Number: _____

Date: _____

Daily Concerns

- _____
- _____
- _____
- _____
- _____
- _____
- _____

Items of discussion

- [illegible]

Meeting Attended by:

[illegible]

Supervisor's

Signature: _____